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㉑ Applicant: Nomix Manufacturing Co. Limited  
Filtonwood Factory Charlton Road  
Kingswood Bristol BS15 1HB (GB)

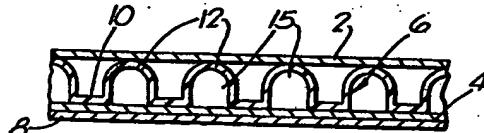
㉒ Inventor: Gill, David Charles  
Wellfield House Parkhouse Lane  
Keynsham Bristol BS18 2SG (GB)

㉓ Representative: Cheyne, John Robert Alexander  
Mackenzie et al  
HASELTINE LAKE & CO. 28 Southampton Buildings  
Chancery Lane  
London WC2A 1AT (GB)

㉔ Flexible containers for liquids.

㉕ A container for liquid, such as herbicide, comprises a liquid-impermeable wall comprising two skins (2, 8) of plastics material. The skins (2, 8) are held apart from each other by a spacer structure (6). The wall of the container is thus less vulnerable to puncture because both skins (2, 8) need to be pierced before leakage will occur. The container is particularly suitable for packaging herbicide.

Fig. 1.



## Description

## FLEXIBLE CONTAINERS FOR LIQUIDS

This invention relates to containers for liquids, and is particularly, although not exclusively, concerned with portable containers for herbicide which is to be delivered from hand-held equipment connected to the container.

It is known for liquids such as wine to be packaged in flexible bags which are, in turn, accommodated in rigid boxes, for example of cardboard. The use of such packaging for herbicide is proposed in British Patent No. 2136321.

The cost of the box, and in particular the cost of erecting it from a flat blank, inserting the filled bag and then closing the box, is a major element in the cost of the package as whole. However, without the box, the bag is vulnerable to puncturing, particularly when used outside for delivering herbicides.

According to the present invention there is provided a container for liquids, having a liquid-impermeable wall of which at least part is formed from two skins of flexible material and a spacer structure disposed between the two skins whereby, in use, the two skins are spaced apart from each other.

A container in accordance with the present invention may thus take the form of a flexible, doubleskinned bag. The outer skin effectively prevents puncturing of the inner skin. The spacing between the skins, which is established by the spacer structure, may, for example, be in the range 2 to 25 mm, and is preferably in the range 5 to 12 mm.

Both of the skins may be made from the same material, preferable plastics material such as polyvinyl chloride or a polyolefin (for example polyethylene). A preferred material, at least for the outer skin, is high density linear polyethylene. The skins may have the same thickness as each other, or one of the skins, such as the outer skin, may be thicker than the other to provide additional strength.

A liner may be disposed inside the inner skin, and may or may not be laminated to the inner skin.

The spacer structure comprises voids, and may be made from flexible material; it may be made from the same material as at least one of the skins. Where both of the skins and the spacer structure are made from a plastics material, they can be bonded together by welding. In an alternative embodiment, the spacer structure may be made from a material such as cardboard.

The spacer structure may have a honeycomb form. For example, the spacer structure may be manufactured from sheets of plastics material welded together at spaced locations to provide elongate cells extending transversely of the skins. Alternatively, the spacer structure may comprise one or more sheets of material, such as cardboard, which are fluted to provide elongate channels extending parallel to the skins. In a preferred embodiment, the spacer structure comprises a flexible sheet which is bonded to one of the skins at locations which define a series of gas-filled pockets or "bubbles". The tops of the bubbles may be bonded to the other skin. The bubbles hold the skins

apart and also serve to cushion the wall of the bag from impact.

5 For a better understanding of the present Invention, and to show how it may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

10 Figure 1 is a diagrammatic sectional view through the wall of a container;

Figure 1A is a plan view of the wall of Figure 1, with the outer skin omitted;

Figure 2 shows a container comprising the wall of Figure 1;

Figure 3 is a sectional view taken along the line III-III in Figure 2;

Figure 4 shows an alternative embodiment of container; and

Figure 5 is a sectional view taken along the line V-V in Figure 4.

The wall structure shown in Figure 1 comprises two skins 2 and 4 which are spaced apart by a spacer structure 6. In use, the skin 2 would be exposed to the outside, with the skin 4 on the inside. A liner 8 is provided adjacent the inner skin 4, but is not bonded to the inner skin 4 except at edge regions, as will be described later.

The spacer structure 6 comprises a plastics sheet which is bonded to the inner skin 4 at regions 10. These regions 10 define "bubbles" 12 which extend away from the inner skin 4 and are bonded at their tops to the outer skin 2. The bubbles 12 define pockets 15 which contain gas (normally air). Each pocket 15 may be substantially gas tight, although it is acceptable for there to be some leakage across the regions 10 between adjacent bubbles 12.

The skins 2 and 4, the spacer structure 6 and the liner 8 may all be made from substantially the same material, although the thicknesses may vary. Also, it may be desirable, for example, for the liner 8 to have special properties in order to avoid deterioration of the liquid to be contained in the bag. Similarly, the outer skin 2 may be provided with printed material identifying the nature of the contents of the bag, and information regarding its use.

Figures 2 and 3 represent a bag formed from the material shown in Figures 1 and 1A. As shown in Figure 2, the bag is generally pillow shaped and is provided with an outlet fitting 14. As shown in Figure 3, the bag is formed by joining together two sheets of the material at edge regions. The sheets may be joined by welding at seams 16. To ensure that the bag is leakproof, it may be desirable for two or more spaced seams 16 to be provided, rather than the single seam as shown.

Figures 4 and 5 show an alternative embodiment. In this embodiment, the spacer structure 6' stops short of the seam 16'. This avoids problems which may otherwise arise where, as in the embodiment of Figures 3 and 4, the weld 16 is formed across the spacer structure 6.

As shown in Figure 5, the spacer structure 6' is a separate element from the inner skin 4', and may be

retained, in an unsecured manner, between the inner and outer skins 2, 4.

Another feature shown in Figure 4 is that the seam 16' includes two oblique portions 18 which slope towards the lower edge of the outlet fitting 14', in the position shown in Figure 4. This arrangement assists in the substantially complete emptying of the bag, without residual amounts of the contents becoming trapped in the corners. Furthermore, it will be noted that the spacer structure 6' stops short of the outlet fitting 14' to avoid difficulties in welding the outlet fitting 14' to the material of the bag.

**Claims**

1. A container for liquids, having a liquid-impermeable wall, characterised in that at least part of the impermeable wall is formed from two skins (2, 4) of flexible material and a spacer structure (6) which is disposed between the two skins (2, 4) whereby, in use, the two skins (2, 4) are spaced apart from each other.

2. A container as claimed in claim 1, characterised in that the container is in the form of a bag.

3. A container as claimed in claim 1 or 2, characterised in that the spacing between the skins (2, 4) is not less than 2mm and not more than 25mm.

4. A container as claimed in claim 3, characterised in that the spacing between the skins (2, 4) is not less than 5mm and not more than 12mm.

5. A container as claimed in any one of the preceding claims, characterized in that the skins (2, 4) are made from a plastics material.

6. A container as claimed in any one of the preceding claims, characterized in that the spacer structure (6) is bonded to at least one of the skins (2, 4).

7. A container as claimed in any one of claims 1 to 5, characterized in that the spacer structure (6) is unattached to the skins (2, 4).

8. A container as claimed in any one of the preceding claims, characterized in that the spacer structure (6) comprises flexible material.

9. A container as claimed in any one of the preceding claims, characterized in that an outlet fitting (14) is provided in the wall of the container.

10. A container as claimed in claim 9, characterized in that the volume enclosed by the container is partially bounded by two mutually inclined boundaries (18), the outlet fitting (14) being situated at the apex of the angle defined by the boundaries (18).

11. A container as claimed in any one of the preceding claims, characterised in that the container contains herbicide.

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Fig. 1.

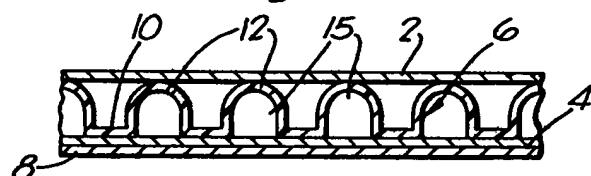


Fig 1A

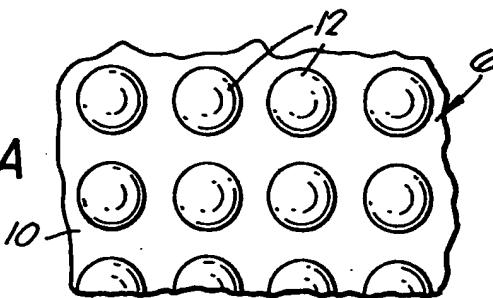


Fig. 2.

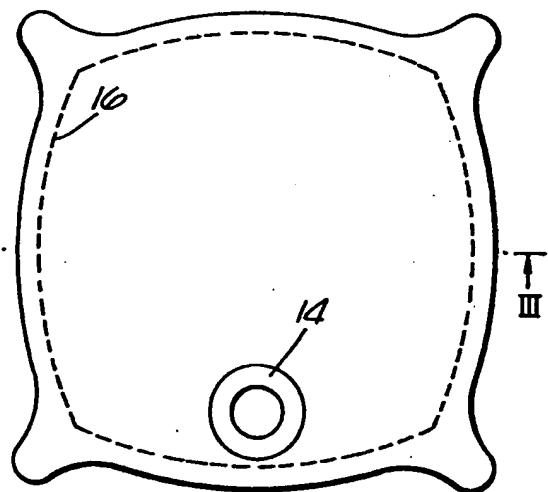
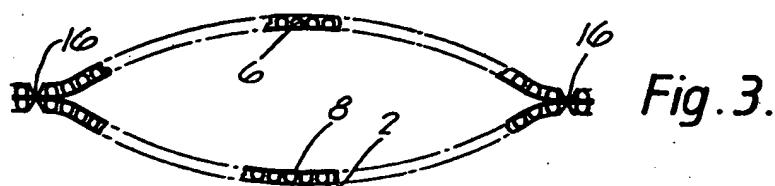


Fig. 3.



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Fig. 4.

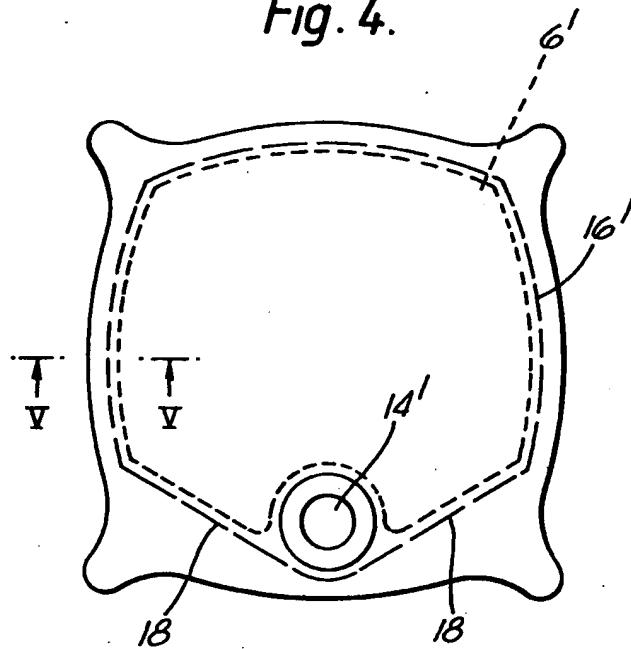


Fig. 5.

